

WHAT IS CLAIMED IS:

1. A sensor system for computing placement information about a component in an electronic component handling machine, the machine releasably holding the component and adapted to rotate the component, the sensor system comprising:

a sensor;

a plurality of divergent light sources in the sensor disposed to illuminate a component zone in the sensor;

a detector positioned relative to the light sources so that when the component is at least partially disposed in the component zone, the component blocks at least some illumination from at least one of the plurality of divergent light sources to form a shadow of at least a portion of the component on the detector, the detector adapted to provide a plurality of detector outputs while the component rotates;

optics interposed between a component zone and the plurality of divergent light sources to reduce the divergence of light passing therethrough; and

computing electronics receiving the detector outputs to compute the placement information.

2. The sensor system of claim 1 wherein the optics is a spherical lens.

3. The sensor system of claim 2 wherein the spherical lens has a substantially flat surface disposed proximate the component zone.

4. The sensor system of claim 3 wherein the flat surface provides a seal against contaminants.

5. The sensor system of claim 1 wherein the optics is a cylindrical lens.

6. The sensor system of claim 5 wherein the cylindrical lens has a substantially flat rear surface.

7. The sensor system of claim 6 wherein the substantially flat rear surface is disposed proximate the component zone to provide a seal against contaminants.

8. The sensor system of claim 1, wherein the optics substantially collimates light passing therethrough.

9. The sensor system of claim 1, and further comprising an ambient light filter disposed proximate

the detector to reduce ambient light falling on the detector.

10. The sensor system of claim 9, wherein the filter is an angular filter.

11. The sensor system of claim 9, wherein the filter is configured to pass the illumination wavelengths, but attenuate ambient light.

12. The sensor system of claim 11, wherein the filter is also an angular filter.